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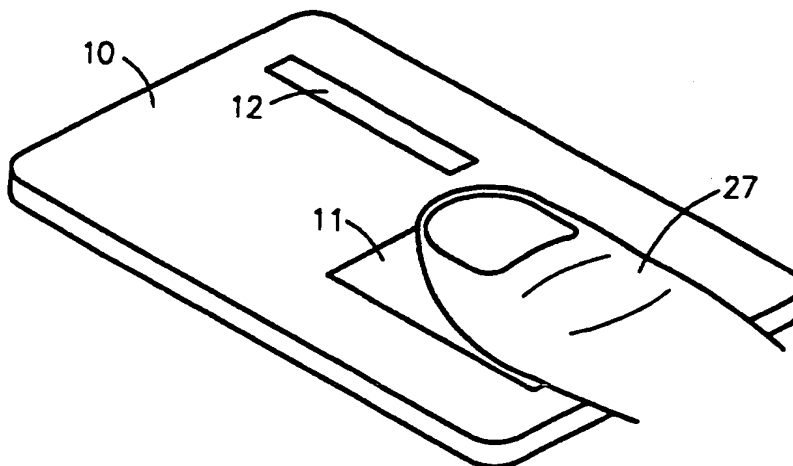
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: <b>PCT/US97/03947</b> (22) International Filing Date: 13 March 1997 (13.03.97) (30) Priority Data: 08/615,091                      13 March 1996 (13.03.96)                      US (71) Applicant: SEAGATE TECHNOLOGY, INC. [US/US]; 920 Disc Drive, Scotts Valley, CA 95066 (US). (72) Inventor: SHUGART, Alan, F.; 1223 Portola Road, Pebble Beach, CA 93953 (US). (74) Agents: LARIVIERE, F., David et al.; LaRiviere, Grubman & Payne, P.O. Box 3140, Monterey, CA 93942 (US).		(81) Designated States: CN, DE, GB, JP, RU.  <b>Published</b> <i>With international search report.          Before the expiration of the time limit for amending the          claims and to be republished in the event of the receipt of          amendments.</i>

(54) Title: PRIVATE PIN NUMBER

## (57) Abstract

A credit card (10) issued to an authorized user which looks like a conventional credit card, but is slightly thicker to house some electronics which enable the card to read (11) the authorized user's fingerprint initially, and only once, and store the fingerprint "signature", and display (12) on the card the need for a Private PIN Number. The display changes to "PIN # O.K." when the same fingerprint is read again. The credit card has a computer chip disposed in a recess therein, and includes a microprocessor and a memory. The credit card is provided with a conventional fingerprint reader and a display such as an LCD display.



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## PATENT APPLICATION

## PRIVATE PIN NUMBER

FIELD OF THE INVENTION

The present invention relates to credit cards and, more particularly, to the use of fingerprint technology to identify the authorized user of a credit card.

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BACKGROUND OF THE INVENTION

Typically, the user of a credit card memorizes a four or five digit personal identification number (PIN) and keys in the number at a card reading machine such as an automated teller machine (ATM) to prove that the user is authorized to use the credit card. Due to the increase of credit card fraud, a more foolproof method is needed to  
10 identify the authorized user of a credit card.

DISCLOSURE OF INVENTION

In accordance with the principles of the present invention, there is provided a credit card incorporating therein a fingerprint reader and a display. The credit card of  
15 the present invention also includes a microprocessor comprising an electrically erasable programmable read only memory (EEPROM), a random access memory (RAM), and a masked read only memory. A battery is connected to the computer chip, as are the fingerprint reader and the display. The credit card is issued to a potential user who permits the card to initially "read" his fingerprint. The fingerprint "signature" is stored  
20 in the credit card. The display on the credit card displays the message that a Private PIN Number is needed. When the same fingerprint is read again, the display message

changes to "PIN # O.K.". The display stays "O.K." for a specified period of time and then reverts to the previous message. Card reading machines like ATM are equipped with a display reader to read the display on the credit card.

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### BRIEF DESCRIPTION OF THE DRAWINGS

For a fuller understanding of the present invention, reference is made to the accompanying drawing taken in conjunction with the following detailed description of the Best Mode Of Carrying Out The Invention. In the drawing:

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Fig. 1 is a perspective view of an embodiment of a credit card constructed in accordance with the principles of the present invention.

Fig. 2 is a plan view of the embodiment of a credit card in accordance with the invention shown in Fig. 1.

Fig. 3 is a fragmentary cross-sectional view of the embodiment of a credit card shown in Figs. 1 and 2, illustrating the mounting of a computer chip therein.

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Fig. 4 is a block diagram of the interconnection of the various electronic elements of the embodiment of a credit card shown in Figs. 1, 2 and 3.

Fig. 5 is a diagrammatic outline drawing of an embodiment of a card reading machine in accordance with the invention.

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Fig. 6 is a flow chart showing method steps involved in employing the credit card of the present invention.

Reference numbers refer to the same or equivalent parts of the invention throughout the several figures of the drawing.

### BEST MODE OF CARRYING OUT THE INVENTION

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Referring now to Figs. 1 and 2 of the drawings, there is illustrated a credit card 10 constructed in accordance with the principles of the present invention. Typically, the credit card 10 is made of plastic and is similar to conventional credit cards except that it may be slightly thicker to accommodate electronic elements disposed in the interior thereof.

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In accordance with the principles of the present invention, the credit card 10 is provided with a fingerprint reader 11 and a display 12. The display 12 may be a liquid crystal display (LCD), or the like. Fingerprint readers are well known. The California

Department of Motor Vehicles employs a fingerprint reader identified as a model MINI.II manufactured by Fingermatrix Inc. of Dobbs Ferry, New York. An article surveying fingerprint technology was published in the Los Angeles Times on April 2, 1995. Some manufacturers of apparatus used in fingerprint technology are the following: Identix  
5 Inc., Sunnyvale, CA; Digital Biometrics Inc., Minnetonka, Minn.; Cogent Systems, Alhambra, CA; Printrak, Costa Mesa, CA, Fitcorp, Redondo Beach, CA; and Nippon Electric Co. (NEC) of Japan.

Referring now to Fig. 3 of the drawings, there is shown a fragmentary cross-sectional view of the credit card 10. As can be seen in Fig. 3, a recess 15 is molded in  
10 the credit card 10. An adhesive layer 16 employing epoxy resin or the like is disposed in the bottom of the recess 15. A computer chip 17 is disposed in the recess 15 and secured by the adhesive layer 16. A printed circuit board (PCB) 18, including printed circuit wiring, is installed in the recess 15 to interconnect the various electronic elements such as the fingerprint reader 11, the display 12 and the computer chip 17.

Referring now to Fig. 4, there is shown a block diagram of the interconnection of  
15 the various electronic elements of the credit card 10. The computer chip 17 includes a microprocessor 20, an electrically erasable programmable read only memory (EEPROM) 21, a random access memory (RAM) 22, and a masked read only memory (ROM) 23. A battery 24 is connected to the computer chip 17, as are the fingerprint reader 11 and the  
20 display 12.

Referring again to Fig. 1, in operation, a credit card 10 is issued to a potential user. The user initially applies a thumb or finger 27 to the fingerprint reader 11. This enables the credit card 10 to "read" one fingerprint initially, and only once, and then store the fingerprint "signature". The display 12 displays a message that a Private  
25 personal identification number (PIN) Number is needed. When the same fingerprint is read again, the message on the display 12 changes to "PIN # O.K.". The display 12 displays the "O.K." message for a predetermined length of time. After the predetermined length of time has elapsed, the previous message is restored.

Referring to Fig. 5, there is shown a diagrammatic outline drawing of an  
30 embodiment of a card reading machine 30, such as an automated teller machine (ATM), or the like. The card reading machine 30 is provided with an opening 31 into which the

credit card 10 is inserted. The card reading machine 30 is provided with a display reader 32 that is positioned to read the message on the display 12.

Referring now to Fig. 6, there is shown a flow chart of method steps employed in utilizing the credit card 10 of the present invention. At the start of the process, block 40 indicates that the authorized user's fingerprint is initially read by the fingerprint reader 11 on the credit card 10. Block 41 indicates that the fingerprint signature is stored. Block 42 indicates that the display 12 displays a message indicating that a Private PIN Number is required. Block 43 indicates that the fingerprint reader 11 reads the same fingerprint again. Block 44 indicates that the display 12 displays the message: "PIN # O.K.".

Block 45 indicates that the message on the display 12 is read by a display reader 32 in card reading machine 30. Finally, block 46 indicates that after a specific time delay, the message displayed by the display 12 reverts to the original message that a Private PIN Number is required.

Thus, the user of a credit card no longer needs to memorize a four or five digit PIN and key the number in to a card reading machine to prove that the user is authorized to use the credit card. The credit card 10 of the present invention reduces the incidence of credit card fraud, because it provides a more foolproof method to identify the authorized user of a credit card.

It is to be understood that the above-described embodiment is merely illustrative of some of the many specific embodiments which represent applications of the principles of the present invention. Clearly, numerous variations can be readily devised by those skilled in the art without departing from the scope of the invention.

CLAIMS

What is claimed is:

1. A credit card for use in a system that provides protection from credit card fraud, said credit card comprising:

5 a credit card for assignment to an authorized user;  
a computer chip disposed in a recess in said credit card, said computer chip including a microprocessor and a memory;  
a fingerprint reader disposed in said credit card for reading a fingerprint of said authorized user, said fingerprint reader being coupled to said computer chip;  
10 a display disposed in said credit card for displaying first and second messages, said display being coupled to said computer chip, said first message being displayed following initially reading a fingerprint of said authorized user and storage of a digital representation thereof in said memory, said second message being displayed following a subsequent reading of said fingerprint of said authorized user, said first  
15 message being again displayed following a predetermined lapse of time.

2. A system for protection from credit card fraud, said system comprising:

a credit card for assignment to an authorized user;  
a computer chip disposed in a recess in said credit card, said computer chip including a microprocessor and a memory;  
20 a fingerprint reader disposed in said credit card for reading a fingerprint of said authorized user, said fingerprint reader being coupled to said computer chip;  
a display disposed in said credit card for displaying first and second messages, said display being coupled to said computer chip;  
a card reading machine having an opening for the insertion of said credit  
25 card; and  
a display reader disposed in said card reading machine in proximity to said credit card when inserted, said display reader reading said display on said credit card, said display reader distinguishing said first and second messages.

3. A method of reducing the incidence of credit card fraud by providing a  
30 personal identification of the authorized user, said method comprising the following steps:

reading initially a fingerprint of an authorized user of a credit card, said reading of said fingerprint taking place within said credit card;

storing an electronic signature corresponding to said fingerprint within said credit card;

5 displaying on said credit card a first message indicating that a private personal identification number (PIN) is required;

reading said fingerprint of said authorized user again, said reading of said fingerprint taking place within said credit card;

10 changing the display on said credit card to a second message indicating that said stored electronic signature matches said fingerprint;

reading said display in a card reading machine;

changing the display on said credit card to said first message after the lapse of a predetermined time delay.



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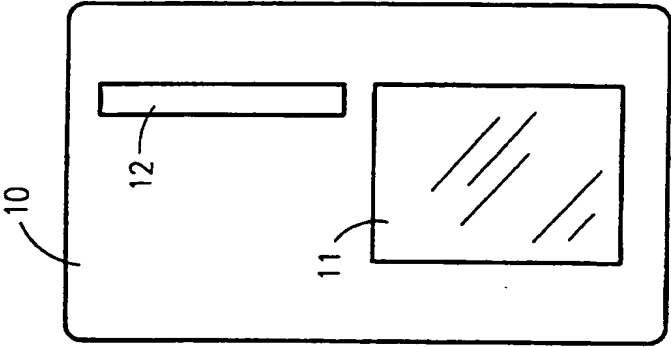


FIG. 2

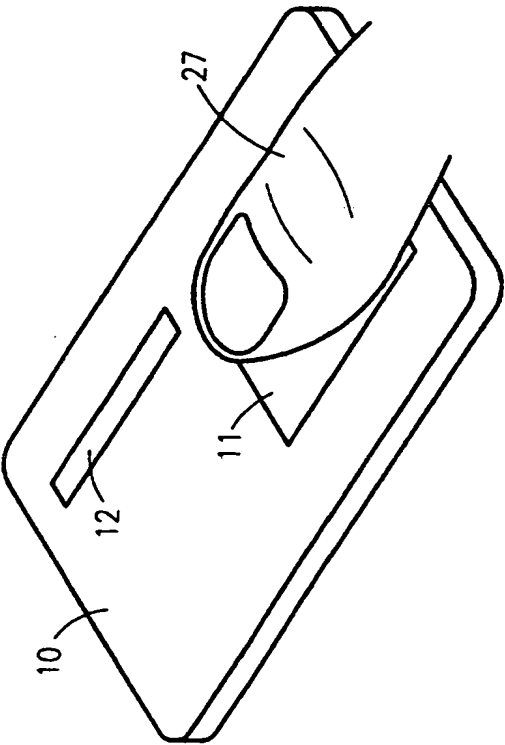


FIG. 1

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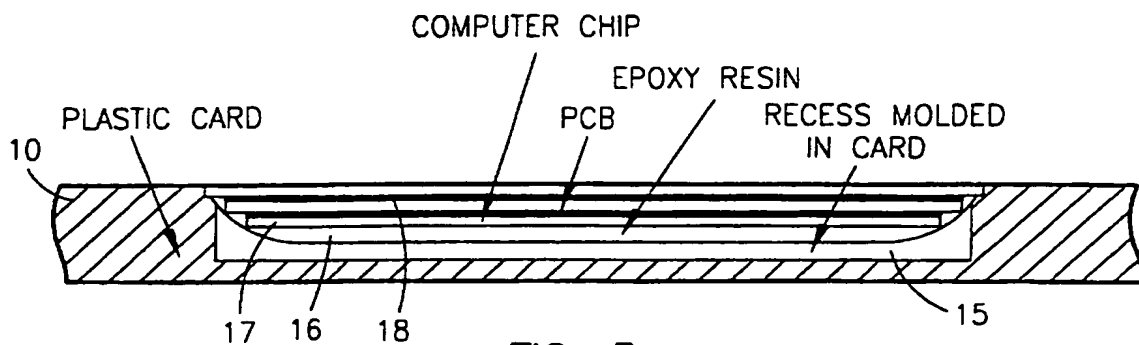


FIG. 3

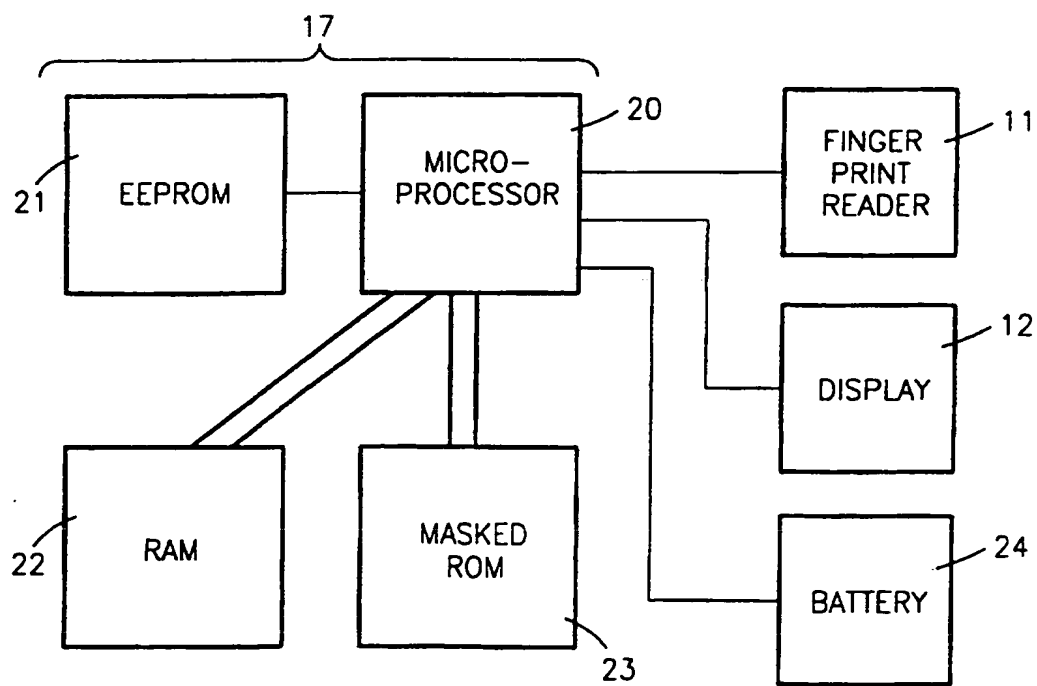


FIG. 4

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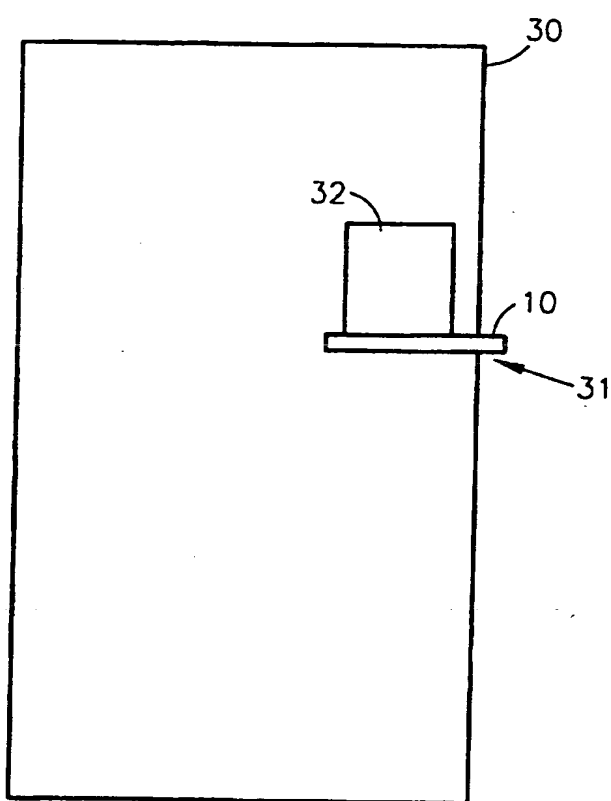
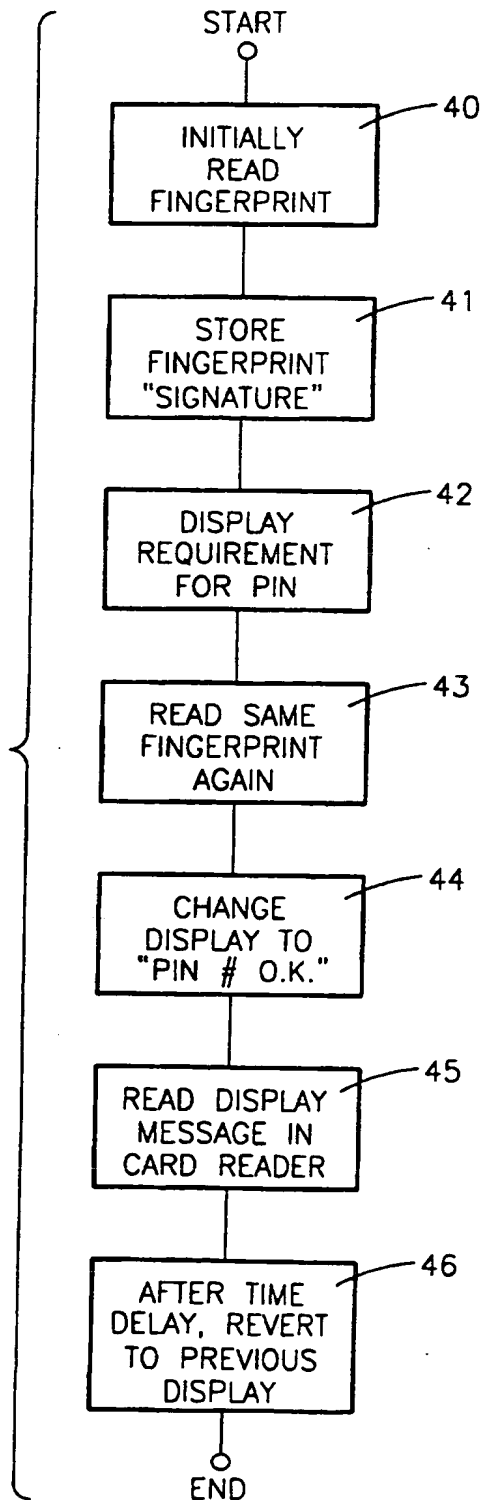


FIG. 5

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FIG. 6



# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US97/03947

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : GO6K 9/00  
US CL : 382/124; 340/825.33

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 382/115, 124; 340/825.3, 825.33, 825.34; 235/380

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
none

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
none

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,E	US, A, 5,623,552 (LANE) 22 April 1997 Abstract; Figs. 1-9, 14, 15; column 1, lines 16-36; column 2, line 14 to column 4, line 15; and column 4, line 58 to column 6, line 56.	1-3

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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Facsimile No. (703) 305-3230

Authorized officer

JOSEPH MANCUSO

Telephone No. (703) 305-8576